

WHAT IS CLAIMED IS:

1                    1.        A method for converting serial data to parallel data, the method  
2   comprising:  
3                    serially loading bits of data into a first register in response to a first periodic  
4   signal;  
5                    parallel loading bytes of the data from the first register into a second register in  
6   response to a second periodic signal; and  
7                    changing boundaries between the data bytes in response to a third signal.

1                    2.        The method of claim 1 wherein changing the boundaries between the data  
2   bytes in response to a the third signal further comprises changing the phase of the second  
3   periodic signal in response to the third signal, wherein the change in the phase of the second  
4   periodic signal causes one of the bits of the data stored in the first register to be discarded.

1                    3.        The method of claim 1 further comprising:  
2   parallel loading the data bytes from the second register into a third register.

1                    4.        The method of claim 3 further comprising:  
2   generating fourth and fifth periodic signals, wherein the third register  
3   synchronizes the data bytes to the fourth periodic signal in response to the fifth periodic signal,  
4   and wherein the fourth periodic signal is used as a clock signal by core circuitry that receives the  
5   data from the third register.

1                    5.        The method of claim 3 further comprising:  
2   parallel loading the data bytes from the third register into core circuitry of a  
3   programmable logic device.

1                    6.        The method of claim 1 further comprising:  
2   generating the first periodic signal using a phase lock loop; and  
3   providing the first periodic signal to an input of a first counter, wherein the first  
4   counter generates the second periodic signal.

1                    7.        The method of claim 6 further comprising:

2 parallel loading the data bytes from the second register into a third register; and  
3 providing the first clock signal to an input of a second counter, wherein the  
4 second counter generates a fourth periodic signal that controls when the data bytes are loaded  
5 into the third register.

1 8. The method of claim 1 further comprising:  
2 disabling the third signal to prevent the boundaries between the data bytes from  
3 changing.

1 9. The method of claim 1 wherein changing the boundaries between the data  
2 bytes in response to the third signal further comprises realigning a data boundary between bytes  
3 of the data bytes by one bit in response to the second periodic signal.

1 10. The method of claim 9 wherein changing the boundaries between the data  
2 bytes in response to the third signal further comprises realigning a data boundary between bytes  
3 of the data bytes by two bits in response to the second periodic signal.

1 11. A serial-to-parallel data conversion circuit comprising:  
2 a first register coupled to receive serial data;  
3 a second register coupled to receive parallel data bytes from the first register; and  
4 a first counter circuit providing a first periodic signal that controls when the  
5 parallel data bytes are transferred from the first register to the second register, the first periodic  
6 signal causing boundaries between the parallel data bytes to change in response to a second  
7 signal.

1 12. The serial-to-parallel data conversion circuit of claim 11 further  
2 comprising:  
3 a phase locked loop circuit that provides a third periodic signal to the first and  
4 second registers and to the first counter, wherein data is shifted through the first and second  
5 registers in response to the third periodic signal.

1 13. The serial-to-parallel data conversion circuit of claim 11 further  
2 comprising:

3                   a third register coupled to receive the parallel data bytes from the second register;  
4    and  
5                   a second counter circuit providing a third periodic signal that controls when the  
6    parallel data bytes are transferred from the second register into the third register.

1                   14.    The serial-to-parallel data conversion circuit of claim 13 wherein the third  
2    register synchronizes the parallel data to a fourth periodic signal generated by the second  
3    counter.

1                   15.    The serial-to-parallel data conversion circuit of claim 13 further  
2    comprising:  
3                   a fourth register coupled between the first counter and the second register; and  
4                   a fifth register coupled between the second counter and the third register.

1                   16.    The serial-to-parallel data conversion circuit of claim 11 further  
2    comprising:  
3                   a third register coupled to the first counter, the third register generating the second  
4    signal, wherein an input of the third register is coupled to receive a fourth signal that blocks the  
5    second signal.

1                   17.    A method for converting serial data to parallel data, the method  
2    comprising:  
3                   loading bits of the serial data into a first data storage circuit in response to a first  
4    periodic signal;  
5                   loading the bits from the first data storage circuit into a second data storage circuit  
6    as parallel data bytes in response to a second periodic signal, wherein boundaries between the  
7    parallel data bytes are determined by the second periodic signal; and  
8                   shifting the boundaries between the parallel data bytes in response to a third  
9    signal.

1                   18.    The method of claim 17 wherein shifting the boundaries between the  
2    parallel data bytes in response to the third signal further comprises increasing the period of the  
3    second periodic signal in response to the third signal.

1           19.     The method of claim 17 further comprising:  
2           loading the parallel data bytes from the second data storage circuit into a third  
3 data storage circuit; and  
4           generating a fourth periodic signal that controls when the data bytes are loaded  
5 into the third data storage circuit.

1           20.     The method of claim 17 further comprising:  
2           generating the first periodic signal using a phase lock loop; and  
3           providing the first periodic signal to an input of a first counter, wherein the first  
4 counter generates the second periodic signal.

1           21.     The method of claim 17 further comprising:  
2           disabling the third signal to prevent the boundary between parallel data bytes from  
3 shifting.

1           22.     A serial-to-parallel data converter comprising:  
2           means for storing bits of serial data in a first storage circuit;  
3           means for storing the bits as parallel data bytes in a second storage circuit;  
4           means for providing a first periodic signal that controls when the bits are  
5 transferred from the first storage circuit to the second storage circuit; and  
6           means for providing a second signal to the means for providing the first periodic  
7 signal, wherein the first periodic signal causes a boundary between the parallel data bytes to  
8 change by at least one bit in response to the second signal.

1           23.     The serial-to-parallel converter of claim 22 further comprising:  
2           means for storing the parallel data bytes in a third storage circuit; and  
3           means for providing a third periodic signal that controls when the parallel data  
4 bytes are transferred from the second storage circuit to the third storage circuit.

1           24.     The serial-to-parallel converter of claim 22 further comprising:  
2           means for generating a third periodic signal using a phase locked loop, wherein  
3 the third periodic signal is provided to the first and the second storage circuits and to the means  
4 for providing the first periodic signal.